

SDEV1201

LESSON 20

NORMALIZATION

ESP 1

Available in Brightspace under Lesson 4
ESP 1 Specifications

Database Management: Normalization Exercise Suite

The **Emergency Service & Product (ESP)** Company is a very small parts and service company. It currently uses a crude paper based system (3 by 5 cards, paper journal, etc.) to keep track of its customers, inventory, suppliers, payments and invoices.

The company is growing rapidly and has found that it is unable to keep pace with the volume of data it must record about its business activities. It has decided that it wishes to automate some portions of its business.

You have been hired to assist the company in analyzing its business activities and to design a set of relational tables that they can use to develop a database system.

The company will provide you with copies of all their paper based forms (invoices, orders, batch records, etc). You will use these over several weeks to analyze the various forms and produce **third normal form (3NF)** relational **entity relationship diagrams (ERD)** for each **view** of their data. As a last step in the process, you will **merge** all the views to produce one integrated ERD and **fully detailed relational entities**.

Customer Details View *

ESP keeps detailed information about each customer so that they can be contacted when needed or when a product needs to be sent in the mail. This information is kept on 3x5 cards as it is fairly static in size and doesn't change very often. The cards look as follows:

Customer Details	Customer Number: 137
Name:	Fred Smith
Address:	123 SomeWhere St.
City:	Edmonton
Province:	Alberta
Postal Code:	T5H 2J9
Home Phone:	436 - 7867

Customer Details View *

Initial Table

CustomerNumber, Name, Address, City, Province, PostalCode, HomePhone

Customer Details View *

1NF

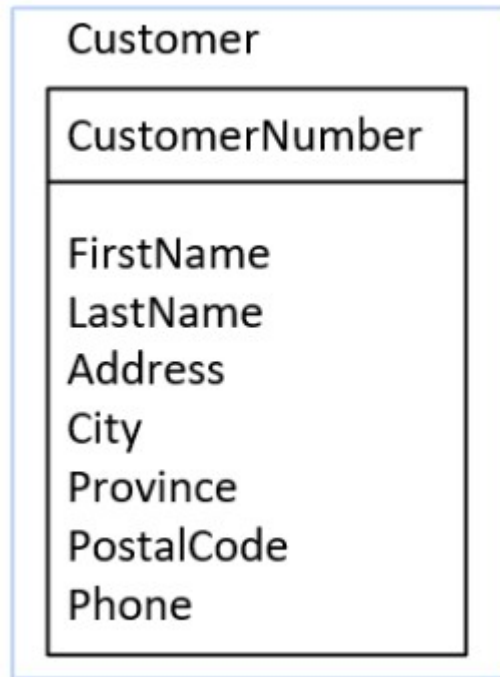
CustomerNumber, **FirstName**, **LastName**, Address, City,
Province, PostalCode, HomePhone

Customer Details View *

2NF

CustomerNumber, **FirstName**, **LastName**, Address, City,
Province, PostalCode, HomePhone

Customer Details View



3NF

CustomerNumber, FirstName, LastName, Address, City, Province, PostalCode, HomePhone

Customer Orders View *

	Customer Name:	Fred Smith	Customer Number:	137
	Address:	123 SomeWhere St. Edmonton, Ab T5H 2J9		
	Phone:	436 - 7867	Date:	Jan 16, 2000
	Order Number: 219			

Item Number	Description	Quantity	Price	Amount
H23	Heater Fan Belt – 23"	1	11.99	11.99
H319	Heater Fan Belt Support Brackets	2	4.99	9.98
M24	Bolts – 24 mm	8	0.29	2.32
			Subtotal:	24.29
			GST:	1.70
			Total:	25.99

ESP has preprinted order forms that they fill in by hand when a customer buys some of their product. The customer details are copied from the customer card onto the order form as well as details about the product ordered. Each order form has a preprinted sequential order number that is unique. The top portion of the forms looks as follows.

Because prices change on a fairly regular basis ESP would like to keep the following information:

- The current price for each item in inventory
- The price each item sold for at the

Customer Orders View *

Initial Table

OrderNumber , CustomerNumber, CustomerName, Address, Phone, Date, (ItemNumber, Description, Quantity, CurrentPrice, SellingPrice, Amount), Subtotal, GST, Total

Customer Orders View *

1NF

OrderNumber (PK), CustomerNumber, CustomerFirstName, CustomerLastName, Address, City, Province, PostalCode, Phone, Date, Subtotal, GST, Total

OrderNumber (PK)(FK), **ItemNumber (PK)**, Description, Quantity, CurrentPrice, SellingPrice, Amount

Customer Orders View *

2NF

OrderNumber, CustomerNumber, CustomerFirstName, CustomerLastName, Address, City, Province, PostalCode, Phone, Date, Subtotal, GST, Total

OrderNumber (PK)(FK), ItemNumber (PK)(FK), Quantity, SellingPrice, Amount

ItemNumber, Description, CurrentPrice

Customer Orders View

3NF

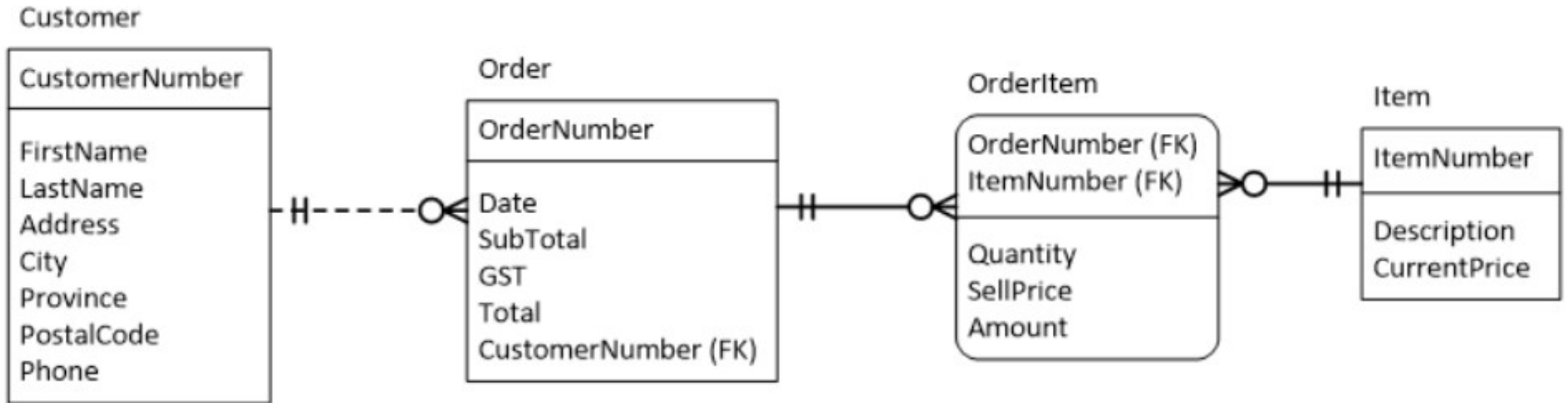
CustomerNumber (PK), CustomerFirstName, LastName,
Address, City, Province, PostalCode, Phone

CustomerNumber (FK), Date, **OrderNumber (PK)**, Subtotal, GST,
Total

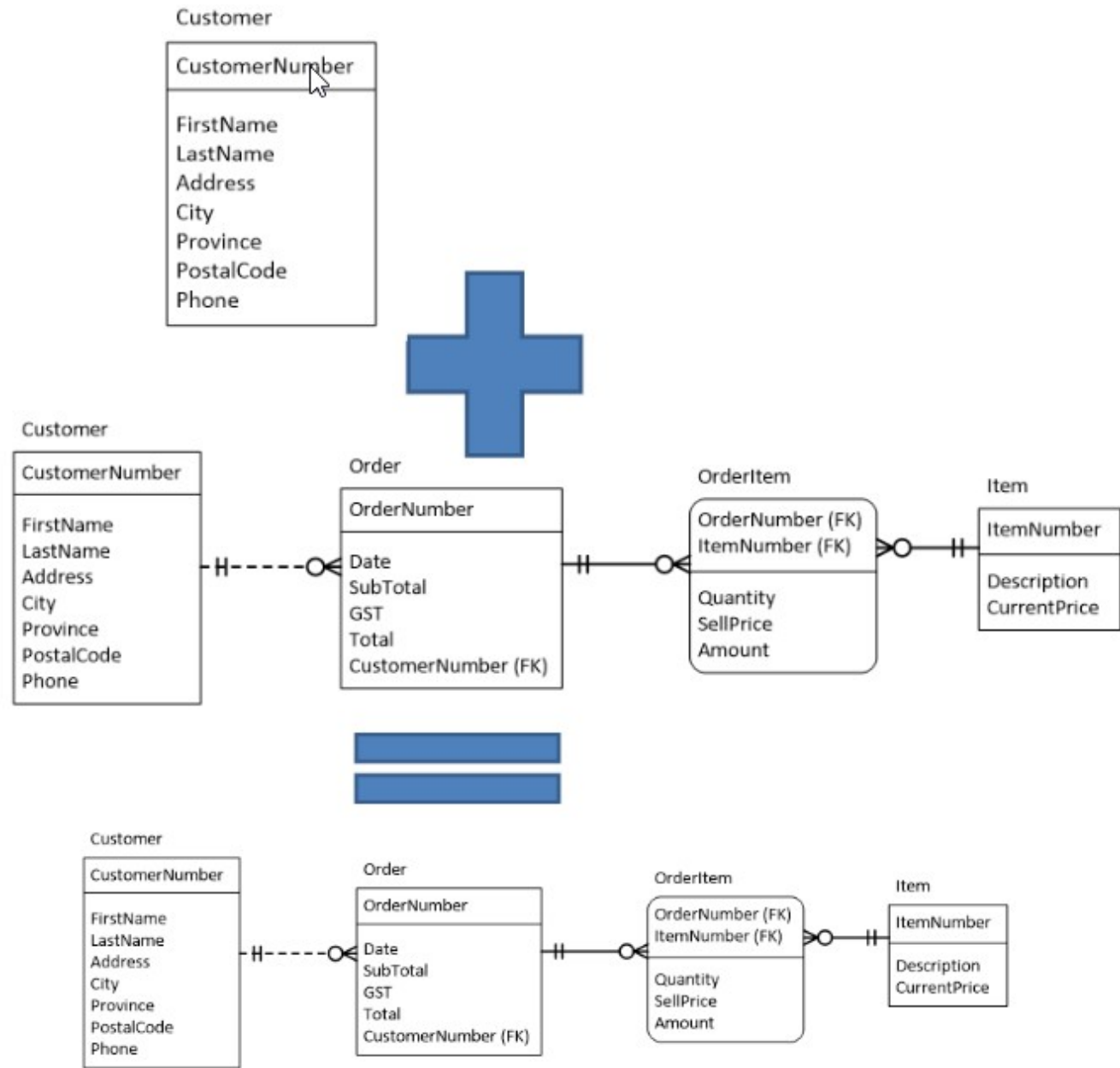
OrderNumber(PK)(FK), **ItemNumber (PK)(FK)**, Quantity,
SellingPrice, Amount

ItemNumber (PK), Description, CurrentPrice

Customer Orders View



Merge



Recommended

From the Brightspace site in “Week 13 – Normalization” in Materials access and review the following:

- 01 Normalization What and Why
- 02 Normalization How

Tasks Before Next Class

Draw.io

Look at <https://draw.io> . It can be used to draw the ERDs which are necessary for the lab.

Here is a brief video on how to use <https://draw.io> :

<https://www.youtube.com/watch?v=JYZPdU5F2iM>

Important: Quiz 4 on Stored Procedures and Triggers will be next **Monday, November 24, 2025.**